OFFICE COPY

April 1, 1991 - MONTANA WATER SUPPLY OUTLOOK REPORT CURRENT

March mountain precipitation was near to above average over most of the state. The heaviest amounts fell over southwest, central and south-central Montana. Snowpack conditions showed some improvement during the month but remain below to well below average over most of the state. Only the mountains of northwest Montana had near to above average snowpacks. Spring and summer streamflows are expected to be below to well below average across much of the state except streams in the northwest and north-central areas which are forecast to be near or above average. The Surface Water Supply Indexes (SWSI) range from -3.4 on the Beaverhead River Basin to +3.3 on the Tobacco River Drainage.

SNOWPACK

Snow accumulation in the mountainous areas of western Montana was near to above average during March. The southwest, central and south-central parts of the state had some improvement to the season's below average snowpack conditions. Over most of the state, snowpack conditions remain below average with only the mountains of northwest and north-central Montana having near to above average snowpacks. West of the Divide, snowpacks generally range from 110 to 130 percent of average on the Kootenai and Flathead River Basins, 90 to 100 percent on the Lower Clark Fork and Blackfoot Basins and 75 to 85 percent on the Bitterroot and Upper Clark Fork Basins. East of the Divide, snowpacks generally range from 70 to 85 percent of average except in the headwater areas of the Sun, Teton, Marias, Milk and St. Mary River Drainages where snowpacks are in the 120 to 130 percent of average range. The lowest snowpack conditions are found in the Red Rock River Drainage, of southwest Montana, where snowpacks are only 50 to 60 percent of average. Snowpacks in the Lower Yellowstone tributaries in Wyoming are near average.

PRECIPITATION

MOUNTAIN AREAS - Mountain precipitation for March was near to above average throughout the state. The extreme western, southwestern, central and south-central parts of the state received precipitation amounts in the 115 to 130 percent of average range. Mountain precipitation totals for the Upper Clark Fork, Flathead, St. Mary, Milk, Sun, Teton and Marias drainages, in northwestern and north-central Montana, were in the 100 to 110 percent of average range. The Bighorn Mountains in Wyoming, which feed the Lower Yellowstone tributaries, received about 130 percent of average precipitation amounts for the month. Since October 1, the cumulative mountain precipitation remains well above average in the northwestern and north-central parts of the state, below average in the southwest corner and near average elsewhere.

VALLEY AREAS - Wetter conditions returned to most valley areas of Montana in March. Precipitation amounts were above to much above average west of the Divide with the exception of a pocket of slightly below average amounts in the Flathead Valley. East of the Divide, precipitation was above to much above average throughout most of north-central, central and south-central Montana. Southwest Montana valleys also received above to much above average precipitation with the greatest amounts falling in the Big Hole and Boulder (Jefferson) River Basins. An area of above to much above average precipitation also fell in extreme northeast Montana north of the Missouri River in Valley, Daniels, Sheridan and northern Roosevelt counties. In contrast, moisture was again scarce across most of southeast Montana as well as part of northeast Montana south of the Missouri River. Some stations in Treasure County and central Carter County reported totals less than 10 percent of average. Most other stations in this dry area generally reported 30 to 50 percent of average amounts.

RESERVOIRS

Reservoir storage levels vary widely across the state. West of the Divide, reservoirs reported storages near to well above average. The exceptions are Lake Koocanusa, Hungry Horse and the combined storage of the eight Mission Valley reservoirs which reported well below to near average storage. East of the Divide, Lima and Clark Canyon Reservoirs reported well below average storage. Bair, Martinsdale, Deadman's Basin and Fort Peck all report storage levels between 70 and 80 percent of average. Most other reservoirs reported near to well above average storage.

STREAMFLOW

Water supply forecasts for the spring and summer period remain below to well below average over much the state. Only the northwest and north-central areas of the state are expected to have near or above average flows. West of the Divide, streamflows are generally forecast to range from 110 to 130 percent of average on the Kootenai and Flathead River Basins, 95 to 105 percent of average on the Clark Fork River below Saint Regis and the Blackfoot River Basins, 75 to 80 percent of average on the Bitterroot River Basin and 60 to 70 percent of average on the Upper Clark Fork River and its tributaries. East of the Divide, streamflows are expected to be above average on the Sun, Teton, Marias, Milk and St. Mary River Basins with forecasts in the 110 to 130 percent of average range. Elsewhere, streamflows are expected to be below to well below average with southwest Montana having the lowest forecasts. Streamflows projections generally range from 40 to 60 percent of average on the Jefferson River and its tributaries; 65 to 75 percent of average on the Madison, Gallatin, Shields and Musselshell River Basins; 70 to 80 percent of average on the Upper Yellowstone River Basin and 80 to 90 percent of average on the Lower Yellowstone tributaries flowing out of Wyoming. Forecasts on the Missouri Mainstem range from about 60 to 70 percent of average above Fort Benton and 70 to 75 percent of average in the lower reaches. With the winter's snow accumulation nearing maximum for the season, projected streamflow conditions are not expected to improve significantly unless well above average precipitation occurs during the spring and early summer months.

SOIL MOISTURE

In general, mountain soil moisture conditions are above average in northwest and north-central Montana, near to a little above average along the western edge of the state and below average in the southwestern and central areas. Basins in south-central Montana show near to a little below average soil moisture.

SURFACE WATER SUPPLY INDEX

The Surface Water Supply Index (SWSI) is a measure of available surface water supplies during the spring and summer months. The index ranges from -4.0 to +4.0. A SWSI of -4.0 represents an extremely dry situation, 0 is near a normal situation and +4.0 represents an extremely wet situation. The SWSI provides a scale to evaluate various levels of wetness or dryness and water supply conditions across the state. The SWSI takes into account snowpack, mountain precipitation, soil moisture and available reservoir storage.

SWSI Scale

SWSI	DESIGNATION
+3.0 to +4.0	Extremely wet
+2.0 to +3.0	Moderately wet
+1.0 to +2.0	Slightly wet
-1.0 to +1.0	Near average
-1.0 to -2.0	Slightly dry
-2.0 to -3.0	Moderately dry
-3.0 to -4.0	Extremely dry

SWSI's are currently available on the following basins. This list will be expanded as SWSI's for other basins are developed.

SWSI as of April 1, 1991 for the remainder of the 1991 irrigation season.

SWSI	BASIN
+3.3	Tobacco River
-2.2	Clark Fork above Blackfoot River
+1.1	Blackfoot River
-0.4	Clark Fork River at Missoula
-1.6	Bitterroot River
-0.8	Clark Fork River below Bitterroot River
-3.4	Beaverhead River
-2.6	Ruby River
-2.7	Big Hole River
-2.8	Boulder River (Jefferson)
-2.8	Jefferson River
-1.7	Madison River
-2.1	Gallatin River
-2.3	Missouri River above Canyon Ferry
-1.1	Smith River
+3.1	Sun River
+3.2	Marias River
-1.8	Musselshell River
+2.7	Milk River
-1.6	Yellowstone River above Livingston
-2.5	Shields River
-1.4	Boulder River (Yellowstone)
-0.5	Stillwater River (Yellowstone)
-1.1	Clarks Fork River
-1.4	Rock-Red Lodge Creek
-1.3	Yellowstone River above Bighorn River
-0.1	Little Bighorn River
-0.4	Tongue River

KOOTENAI RIVER BASIN in Montana

Mountain precipitation was about 130 percent of average for March. Since October 1, the cumulative total is 150 percent of average. Mountain snowpacks range from 95 percent of average on the Fisher River Basin to 130 percent of average on the Tobacco River Basin. Storage in Lake Koocanusa is 60 percent of average. Spring and summer streamflows are forecast to be above average in the 115 to 140 percent of average range. The Surface Water Supply Index (SWSI) for the Tobacco River is +3.3.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
		<---DRIER---	FUTURE		--WETTER--->			
		-----	CHANCE OF EXCEEDING *			-----		
TOBACCO nr Eureka	APR-JUL	168	181	190	141	199	210	135
	APR-SEP	184	200	210	141	220	235	149
KOOTENAI bl Libby Dam (1,2)	APR-JUL	6530	7290	7640	130	7990	8750	5885
	APR-SEP	7660	8550	8960	130	9370	10300	6903
FISHER nr Libby	APR-JUL	270	290	300	127	315	330	236
	APR-SEP	290	305	320	126	335	350	253
YAAK nr Troy	APR-JUL	495	540	570	115	600	645	495
	APR-SEP	520	565	595	115	625	670	518
KOOTENAI at Leonia (1,2)	APR-JUL	8020	8960	9390	128	9820	10800	7340
	APR-SEP	9220	10300	10800	128	11300	12400	8441

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
LAKE KOOCANUSA	5748.0	1078.0	1450.0	1786.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
EAST KOOTENAI in B.C.	27	125	135
KOOTENAI MAINTSTEM in MT	30	111	112
TOBACCO	5	123	129
FISHER	6	108	97
YAAK	10	110	114
KOOTENAI in MT	37	111	113
KOOTENAI ab Bonners Ferry	64	116	120

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
NF FLATHEAD nr Columbia Falls	APR-JUL	2000	2110	2180	128	2250	2360	1701
	APR-SEP	2210	2330	2410	128	2490	2610	1880
MF FLATHEAD nr West Glacier	APR-JUL	1900	2030	2120	126	2210	2340	1680
	APR-SEP	2070	2210	2310	126	2410	2550	1836
SF FLATHEAD nr Columbia Fls (1,2)	APR-JUL	2230	2440	2530	120	2620	2830	2110
	APR-SEP	2370	2600	2700	120	2800	3030	2249
FLATHEAD at Columbia Falls (2)	APR-JUL	6460	6790	7010	125	7230	7560	5622
	APR-SEP	7000	7370	7620	125	7870	8240	6114
STILLWATER nr Whitefish	APR-JUL	215	225	235	131	245	255	180
	APR-SEP	235	250	260	131	270	285	199
WHITEFISH nr Kalispell	APR-JUL	115	124	131	130	138	148	101
	APR-SEP	131	141	148	130	155	165	114
SWAN nr Bigfork	APR-JUL	630	670	700	117	730	770	599
	APR-SEP	715	765	800	117	835	885	685
FLATHEAD nr Polson (1,2)	APR-JUL	7090	7760	8070	123	8380	9050	6586
	APR-SEP	7660	8440	8790	123	9140	9920	7150

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
CAMAS (4)	45.2	36.6	26.4	23.8
MISSION VALLEY (8)	100.0	25.8	50.0	41.3
HUNGRY HORSE	3451.0	1714.0	2168.0	2098.0
FLATHEAD LAKE	1791.0	858.2	802.9	753.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
NORTH FORK FLATHEAD	15	119	126
MIDDLE FORK FLATHEAD	11	111	121
SOUTH FORK FLATHEAD	12	118	116
STILLWATER-WHITEFISH	9	119	114
SWAN	14	116	111
MISSION VALLEY	7	108	106
LITTLE BITTERROOT-ASHLEY	10	140	105
JOCKO	7	123	106
FLATHEAD	57	117	116

UPPER CLARK FORK RIVER BASIN

March precipitation in the mountainous areas of the basin was about 110 percent of average. The cumulative total since October 1 is now 95 percent of average. Basin snowpack conditions improved slightly during the month but remain below average. Snowpacks in the Blackfoot River Basin are near average. Mountain soil moisture conditions are near to above normal in the Blackfoot River Basin and below normal elsewhere. Streamflows for the spring and summer period are forecast to be well below average on the Upper Clark Fork River and its tributaries and near average on the Blackfoot River Basin. Surface Water Supply Index (SWSI) is -2.2 for the Clark Fork River above the Blackfoot River, +1.1 for the Blackfoot River and -0.4 for the Clark Fork River at Missoula.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
MOULTON RES inflow (million gal.)	APR-JUN	77	119	147	63	176	215	233
	APR-JUL	81	129	162	63	195	245	257
WARM SPRINGS CK at Anaconda (2)	APR-JUL	14.0	21	25	66	29	36	38
	APR-SEP	19.0	26	31	66	36	44	47
LITTLE BLACKFOOT nr Garrison	APR-JUL	12.0	40	59	63	78	106	94
	APR-SEP	13.0	43	64	63	85	115	102
FLINT CK nr Southern Cross (2)	APR-JUL	4.4	7.5	9.6	63	11.7	14.8	15.2
	APR-SEP	4.7	8.6	11.3	63	14.0	17.9	18.0
FLINT CK bl Boulder Ck	APR-JUL	20	31	39	64	47	58	61
	APR-SEP	27	41	50	64	59	73	78
LOWER WILLOW CK RES inflow	APR-JUL	4.0	7.4	9.7	65	12.0	15.4	14.9
	APR-SEP	4.4	7.9	10.3	65	12.7	16.2	15.8
MF ROCK CK nr Philipsburg	APR-JUL	38	46	51	74	56	64	69
	APR-SEP	43	51	57	74	63	71	77
ROCK CK nr Clinton	APR-JUL	161	196	220	72	245	280	306
	APR-SEP	184	225	250	72	275	315	345
NEVADA CK nr Finn	APR-JUL	5.5	10.7	14.3	68	17.9	23	21
	APR-SEP	5.7	11.2	15.0	68	18.8	24	22
CLEARWATER nr Clearwater	APR-JUL	156	167	175	104	183	194	168
	APR-SEP	166	177	185	104	193	205	178
BLACKFOOT nr Bonner	APR-JUL	675	755	810	93	865	945	874
	APR-SEP	750	840	900	93	960	1050	969
CLARK FORK ab Milltown	APR-JUL	265	390	480	68	570	695	703
	APR-SEP	315	460	560	69	660	805	812
CLARK FORK ab Missoula	APR-JUL	970	1160	1290	82	1420	1610	1577
	APR-SEP	1110	1320	1460	82	1600	1810	1781

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
GEORGETOWN LAKE	31.0	29.6	27.2	24.4
LOWER WILLOW CREEK	4.9	2.3	4.2	2.2
NEVADA CREEK	12.6	8.3	8.7	7.5

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
CLARK FORK ab FLINT CREEK	28	93	81
FLINT CREEK	14	90	74
ROCK CREEK	5	97	84
CLARK FORK ab BLACKFOOT	45	94	82
BLACKFOOT	23	115	98
UPPER CLARK FORK	64	102	88

BITTERROOT RIVER BASIN

Mountain precipitation was about 120 percent of average during March. Since October 1, the cumulative precipitation is 95 percent of average. Mountain snowpacks are a little below average. Soil moisture conditions are near to a little below normal. Storage in Lake Como is near average. Spring and summer streamflows are expected to be below average in the 75 to 85 percent of average range. The Surface Water Supply Index (SWSI) for the Bitterroot River is -1.6.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
WF BITTERROOT nr Conner (2)	APR-JUL	92	112	125	77	139	158	163
	APR-SEP	99	121	135	76	149	171	177
BITTERROOT nr Darby	APR-JUL	310	365	405	77	445	500	524
	APR-SEP	345	400	440	77	480	535	573
ROCK CK nr Darby (2)	APR-JUL	56	63	68	85	73	81	80
	APR-SEP	60	67	72	86	77	85	84
SKALKAHO CK nr Hamilton	APR-JUL	29	34	38	79	42	47	48
	APR-SEP	35	41	45	80	49	55	56
BURNT FORK CK nr Stevensville (2)	APR-JUL	16.0	20	23	77	26	31	30
	APR-SEP	19.0	24	28	78	32	37	36
BITTERROOT at Missoula	APR-JUL	875	995	1080	79	1160	1290	1371
	APR-SEP	960	1090	1180	79	1270	1400	1495

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
PAINTED ROCKS LAKE	31.7	1.6	1.0	15.7
COMO	34.9	16.2	18.0	15.5

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
WEST FORK BITTERROOT	9	98	79
EAST SIDE BITTERROOT	7	99	84
WEST SIDE BITTERROOT	9	100	84
BITTERROOT	25	99	83

LOWER CLARK FORK RIVER BASIN

Mountain precipitation was about 125 percent of average for March. Cumulative precipitation since October 1 is now 120 percent of average. Mountain snowpacks in the Bitterroot and Upper Clark Fork River Basins are between 80 and 90 percent of average. Basin snowpacks on the smaller tributaries are about 90 percent of average. Storage in Noxon Reservoir is 150 percent of average. Streamflows for the spring and summer period are forecast to be 80 percent of average between Missoula and Saint Regis and 95 to 105 percent of average in the lower reaches. The smaller tributaries are forecast to be near or a little above average. The Surface Water Supply Index (SWSI) is -0.4 for the Clark Fork River at Missoula, -1.6 for the Bitterroot River and -0.8 for the Clark Fork River below the Bitterroot River.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
		<---DRIER---	FUTURE			--WETTER--->		
		-----	CHANCE OF EXCEEDING *			-----		
CLARK FORK ab Missoula	APR-JUL	970	1160	1290	82	1420	1610	1577
	APR-SEP	1110	1320	1460	82	1600	1810	1781
CLARK FORK bl Missoula	APR-JUL	1880	2170	2370	80	2570	2860	2948
	APR-SEP	2100	2420	2640	81	2860	3180	3276
CLARK FORK at St. Regis (1)	APR-JUL	2140	2800	3100	80	3400	4060	3894
	APR-SEP	2370	3110	3440	80	3770	4510	4325
CLARK FORK nr Plains (1,2)	APR-JUL	9230	10700	11300	104	11900	13300	10850
	APR-SEP	10100	11700	12400	104	13100	14700	11930
THOMPSON nr Thompson Falls	APR-JUL	210	240	260	117	280	310	222
	APR-SEP	235	270	290	116	310	345	250
PROSPECT CK at Thompson Falls	APR-JUL	95	113	125	98	137	156	128
	APR-SEP	101	121	134	98	147	167	137
CLARK FK at Whitehorse Rpds (1,2)	APR-JUL	10100	11700	12500	103	13300	14900	12150
	APR-SEP	11100	13000	13800	103	14600	16500	13370

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
NOXON RAPIDS	335.0	331.7	318.9	213.6

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
UPPER CLARK FORK	64	102	88
BITTERROOT	25	99	83
LOWER CLARK FORK	26	104	93
CLARK FORK TOTAL	107	102	89
FLATHEAD	44	117	119
PEND OREILLE	155	108	99

JEFFERSON RIVER BASIN

Mountain precipitation was about 120 percent of average for March. This brought some improvement to the droughty conditions that exist over the basin. The cumulative mountain precipitation since October 1 is now 80 percent of average. Basin snowpack conditions remain below to well below average in the 70 to 80 percent of average range. Snowpacks in some areas of the Red Rock River Drainage are in the 50 to 60 percent of average range. Soils under the snowpack remain dryer than normal. Reservoir storage levels range from much below average in Lima and Clark Canyon Reservoirs to near average in Ruby Reservoir. Streamflows for the spring and summer period are forecast to be between 40 and 60 percent of average. The Surface Water Supply Index (SWSI) are: Beaverhead River -3.4; Ruby River -2.6; Jefferson River -2.8; Big Hole River -2.7; Boulder River -2.8.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
RED ROCK RIVER near Monida (2)	APR-JUL	27	33	48	46	63	85	105
	APR-SEP	34	40	53	46	70	95	114
BEAVERHEAD RIVER near Grant (2)	APR-JUL	18.0	37	64	43	97	146	149
	APR-SEP	19.0	42	75	43	114	171	175
BEAVERHEAD RIVER at Barratts (2)	APR-JUL	29	52	90	47	128	183	192
	APR-SEP	40	63	106	47	149	215	224
RUBY RIVER near Alder	APR-JUL	36	45	55	62	65	80	89
	APR-SEP	47	55	67	63	79	96	106
BIG HOLE RIVER near Melrose	APR-JUL	220	325	400	57	475	580	696
	APR-SEP	230	345	425	56	505	620	757
BOULDER RIVER near Boulder	APR-JUL	25	43	57	63	71	92	91
	APR-SEP	30	45	60	62	75	98	97
WILLOW CREEK near Harrison	APR-JUL	5.1	6.0	8.2	43	12.2	18.1	18.9
	APR-SEP	5.9	6.9	9.0	43	13.4	20	21
JEFFERSON near Three Forks (2)	APR-JUL	270	325	430	41	620	900	1042
	APR-SEP	275	345	470	41	670	960	1156

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
LIMA	84.0	13.4	22.8	39.1
CLARK CANYON	255.6	102.0	101.3	152.7
RUBY RIVER	38.8	29.9	29.8	31.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
BEAVERHEAD	34	98	71
RUBY	14	94	73
BIGHOLE	29	95	78
BOULDER	15	87	80
JEFFERSON	75	95	75

MADISON RIVER BASIN

March mountain precipitation was about 115 percent of average. Since October 1, the cumulative precipitation is about 80 percent of average. Basin snowpacks are about 80 percent of average. Soil under the snowpack remain drier than normal. Storage in Hebgen Lake is 115 percent of average while Ennis Lake has about 90 percent of average. Spring and summer streamflows are forecast to be about 65 percent of average. The Surface Water Supply Index (SWSI) for the Madison River is -1.7.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
MADISON RIVER near Grayling (2)	APR-JUL	210	245	270	68	295	330	399
	APR-SEP	270	310	340	68	370	410	499
MADISON RIVER near McAllister (2)	APR-JUL	345	410	450	66	490	555	680
	APR-SEP	455	525	570	67	615	685	856

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
ENNIS LAKE	41.0	30.5	29.7	33.7
HEBGEN LAKE	377.5	271.4	258.6	241.1

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
MADISON above HEBGEN	15	103	80
LOWER MADISON	22	98	80
MADISON	36	100	80

GALLATIN RIVER BASIN

Precipitation in the mountainous areas was about 105 percent of average for March. Cumulative precipitation since October 1 is now 80 percent of average. Mountain snowpacks are 75 to 80 percent of average. Soil moisture conditions remain below normal. Streamflows for the spring and summer period are forecast to range from about 70 to 75 percent of average. The Surface Water Supply Index (SWSI) for the Gallatin River is -2.1.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
GALLATIN RIVER near Gateway	APR-JUL	270	310	340	74	370	410	460
	APR-SEP	325	370	400	74	430	475	540
E & W FK HYALITE CK nr Bozeman	APR-JUL	13.1	16.0	18.0	75	20	23	24
	APR-SEP	16.0	19.0	21	75	23	26	28
HYALITE CREEK near Bozeman (2)	APR-JUL	21	26	29	76	32	37	38
	APR-SEP	25	31	34	77	38	43	44
GALLATIN RIVER at Logan	APR-JUL	225	305	365	69	425	505	528
	APR-SEP	275	365	425	69	485	575	616

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
MIDDLE CREEK	8.0	5.1	4.6	3.9

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
UPPER GALLATIN	14	94	81
EAST GALLATIN	13	89	76
GALLATIN	24	92	78

MAINSTEM MISSOURI RIVER BASIN

Mountain precipitation was a little above average for March. Total cumulative precipitation since October 1 is now about 95 percent of average. Mountain snowpack conditions range from 70 to 80 percent of average on the Missouri Headwaters, 80 to 90 percent of average on the Smith and smaller tributaries in the central part of the basin and 120 to 130 percent of average in the headwaters of the major tributaries to the north. Spring and summer streamflows are expected to range from 60 to 70 percent of average on the Missouri Mainstem above Fort Benton and 75 percent of average below Fort Benton. The Surface Water Supply Index for the Missouri River above Canyon Ferry is - 2.3.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
		<---DRIER---	FUTURE	CHANCE OF EXCEEDING *		---WETTER--->		
MISSOURI RIVER at Toston (2)	APR-JUL	855	1070	1300	58	1530	1880	2250
	APR-SEP	1090	1270	1520	59	1770	2150	2590
PRICKLY PEAR CREEK nr Clancy	APR-JUL	9.3	11.7	18.0	69	24	34	26
	APR-SEP	11.0	14.0	21	68	28	38	31
SUN RIVER at Gibson Dam (2)	APR-JUL	455	530	580	117	630	705	494
	APR-SEP	510	590	640	118	695	770	542
MISSOURI RIVER at Fort Benton (2)	APR-JUL	1040	1790	2320	67	2850	3640	3470
	APR-SEP	1360	2090	2670	67	3250	4110	3990
MARIAS RIVER near Shelby (2)	APR-JUL	375	520	620	130	720	865	478
	APR-SEP	395	545	650	130	755	905	501
MISSOURI RIVER at Virgelle (2)	APR-JUL	1390	2280	2940	74	3600	4560	3960
	APR-SEP	1760	2600	3320	74	4040	5090	4500
MISSOURI RIVER near Landusky (2)	APR-JUL	1510	2420	3180	74	3940	5060	4310
	APR-SEP	1910	2780	3600	73	4420	5630	4900
MISSOURI RIVER blw Fort Peck (2)	APR-JUL	1410	2300	3170	74	4040	5310	4260
	APR-SEP	1540	2600	3550	74	4500	5890	4800
LAKE SAKAKAWEA Inflow (2)	APR-JUL	4220	6530	8100	74	9670	12000	11000
	APR-SEP	4540	7260	9100	75	10900	13700	12200

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
CANYON FERRY LAKE	2043.0	1429.0	1354.0	1502.0
HELENA VALLEY	9.2	4.7	2.8	4.5
LAKE HELENA	10.4	10.9	10.9	10.0
HAUSER & HELENA	61.9	63.1	63.1	60.6
HOLTER LAKE	81.9	81.9	81.0	65.0
FORT PECK LAKE (MAF)	18.9	10.5	11.2	15.1

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
MISSOURI HEADWATERS	118	96	77
WEST SIDE MISSOURI	12	89	87
SMITH-BELT	11	90	86
MAINSTEM MISSOURI	23	90	86
SUN-TETON-MARIAS	18	118	125
JUDITH-MUSSELSHELL	20	82	82
MISSOURI above FORT PECK	164	98	84
MILK RIVER	11	119	115
MISSOURI in MONTANA	173	98	84
MISSOURI blw YELLOWSTONE	278	99	87

SMITH-JUDITH-MUSSELSHELL RIVER BASINS

Mountain precipitation during March was 120 percent of average. The cumulative precipitation since October 1 is 95 percent of average. Basin snowpack conditions are in the 80 to 90 percent of average range. High elevation snowpacks are better than at the lower elevations. Soil moisture conditions are drier than normal. Reservoir storage range from much below to below average. Spring and summer streamflows are expected to be 55 to 65 percent of average. The Surface Water Supply Index (SWSI) is -1.1 for the Smith River and -1.8 for the Musselshell River.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
SMITH RIVER nr Ft. Logan	APR-JUL	17.0	25	38	56	52	71	68
	APR-SEP	21	31	45	56	59	81	80
SHEEP CK nr White Sulphur Springs	APR-JUL	10.7	13.3	15.0	80	16.7	19.3	18.8
	APR-SEP	12.6	15.5	17.5	80	19.5	22	22
NF MUSSELSHELL near Delpine	APR-JUL	1.3	2.4	3.2	63	4.0	5.1	5.1
	APR-SEP	1.6	2.9	3.8	64	4.7	6.0	5.9
SF MUSSELSHELL abv Martinsdale	APR-JUL	10.0	22	35	61	48	67	57
	APR-SEP	10.0	24	38	62	52	72	61

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
SMITH RIVER	10.6	5.9	4.6	7.8
NEWLAN CREEK	12.4	9.4	8.7	8.9
BAIR	7.0	3.5	3.8	4.9
MARTINSDALE	23.1	7.8	12.1	10.2
DEADMAN'S BASIN	72.2	39.6	37.0	52.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
SMITH-BELT	11	90	86
JUDITH-MUSSELSHELL	20	82	82

SUN-TETON-MARIAS RIVER BASINS

March mountain precipitation was 110 percent of average. Since October 1, the cumulative precipitation is 140 percent of average. Mountain snowpacks in the headwater areas along the Continental Divide range from 120 to 130 percent of average. Soil moisture conditions are above normal in the mountainous areas. Reservoir storages are generally near to above average. Streamflow forecasts for the spring and summer period range from 120 to 130 percent of average. The Surface Water Supply Index (SWSI) is +3.1 for the Sun River and +3.2 for the Marias River.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
SUN RIVER at Gibson Dam (2)	APR-JUL	455	530	580	117	630	705	494
	APR-SEP	510	590	640	118	695	770	542
TWO MEDICINE CREEK nr Browning (2)	APR-JUL	225	270	300	135	330	375	222
	APR-SEP	245	290	320	136	350	395	235
BADGER CREEK near Browning (2)	APR-JUL	104	126	140	131	155	176	107
	APR-SEP	127	150	165	134	181	205	123
SWIFT RESERVOIR Inflow nr Dupuyer	APR-JUL	62	78	89	127	100	116	70
	APR-SEP	77	94	105	128	117	134	82
DUPUYER CREEK near Valier	APR-JUL	3.0	14.0	21	124	28	39	17.0
	APR-SEP	4.0	15.0	23	123	31	42	19.0
CUT BANK CREEK at Cut Bank	APR-JUL	83	99	110	120	121	137	92
	APR-SEP	93	109	120	120	131	147	100
MARIAS RIVER near Shelby (2)	APR-JUL	375	520	620	130	720	865	478
	APR-SEP	395	545	650	130	755	905	501

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
GIBSON	99.1	46.9	60.2	48.9
PISHKUN	32.0	18.4	18.3	18.7
WILLOW CREEK	32.2	27.9	30.9	22.0
LOWER TWO MEDICINE LAKE		NO REPORT		
FOUR HORNS LAKE		NO REPORT		
SWIFT	30.0	22.9	19.0	16.4
LAKE FRANCES	112.0	69.0	92.2	69.6
LAKE ELWELL (TIBER)	1347.0	668.3	743.6	572.2

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
SUN-TETON	12	122	124
MARIAS	7	116	126
SUN-TETON-MARIAS	18	118	125

ST. MARY and MILK RIVER BASINS

Mountain precipitation was a little above average for March. Cumulative precipitation since October 1 is 130 percent of average. Mountain snowpacks in the St. Mary and Milk headwater areas range from 120 to 130 percent of average while the Bear Paw Mountains have 75 percent of average snowpack. Soil moisture conditions range from wetter than normal in the western headwater areas to drier than normal in the lower reaches of the Milk River Drainage. Reservoir storages range from 75 percent of average in Fresno to well above average in Lake Sherburne and Beaver Creek Reservoirs. Spring and summer streamflows are expected to be in the 110 to 115 percent of average range. The Surface Water Supply Index (SWSI) is +2.7 for the Milk River (USBR Project water users).

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
		<---DRIER---		FUTURE			--WETTER--->	
		-----		CHANCE OF EXCEEDING *			-----	
SWIFTCURRENT CK at Sherburne (2)	APR-JUL	110	119	125	114	131	140	110
	APR-SEP	129	138	145	113	152	162	128
ST. MARY RIVER near Babb (2)	APR-JUL	370	410	440	109	470	510	404
	APR-SEP	430	480	510	108	540	590	474
MILK RIVER at Eastern Crossing	APR-SEP	66	70	80	110	109	122	73
MILK RIVER at Eastern Crossing (2)	APR-SEP			265	111			239

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
LAKE SHERBURNE	64.3	37.6	37.7	23.3
FRESNO	127.0	57.0	91.4	77.3
BEAVER CREEK	3.5	3.2	3.2	2.3
NELSON	66.8	33.9	39.9	36.6

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
MILK HEADWATERS	4	131	129
BEAR PAW	7	83	76
MILK RIVER	11	119	115
ST. MARY	7	120	123
ST. MARY and MILK	13	116	117
BOW RIVER in ALBERTA	22	122	152
OLDMAN RIVER in ALBERTA	7	121	140

UPPER YELLOWSTONE RIVER BASIN

Mountain precipitation during March was 130 percent of average. The cumulative precipitation since October 1 is now 95 percent of average. Mountain snowpacks are generally in the 80 to 90 percent of average range except on the Shields River which is 75 percent of average. Soil moisture conditions are below normal on the Shields River and range from a little below to a little above normal elsewhere. Streamflow forecasts for the spring and summer period generally range from 75 to 80 percent of average. Exceptions are the Shields River near Livingston which is forecast to be 65 percent of average and Red Lodge Creek below Cooney Reservoir which is forecast to be near 90 percent of average. The Surface Water Supply Indexes are: Yellowstone River above Livingston -1.6; Shields River -2.5; Boulder River - 1.4; Stillwater River -0.5; Clarks Fork River -1.1; Red Lodge-Rock Creek -1.4; Yellowstone River above Bighorn River -1.3.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
		<---DRIER---	FUTURE		--WETTER--->			
		-----	CHANCE OF EXCEEDING *			-----		
YELLOWSTONE at Lake Outlet	APR-JUL	375	430	470	80	510	565	590
	APR-SEP	535	610	660	81	710	785	818
YELLOWSTONE at Corwin Springs	APR-JUL	1080	1210	1300	79	1390	1520	1650
	APR-SEP	1350	1500	1600	80	1700	1850	2000
YELLOWSTONE RIVER near Livingston	APR-JUL	1280	1430	1530	80	1630	1780	1920
	APR-SEP	1550	1720	1830	79	1940	2110	2330
SHIELDS RIVER near Livingston	APR-JUL	45	77	110	65	143	191	168
	APR-SEP	56	92	125	67	159	210	187
BOULDER RIVER at Big Timber	APR-JUL	187	235	265	75	295	345	353
	APR-SEP	210	255	290	76	325	370	384
W. ROSEBUD CREEK near Roscoe (2)	APR-JUL	38	45	50	78	55	62	64
	APR-SEP	53	60	65	78	70	77	83
STILLWATER RIVER nr Absarokee (2)	APR-JUL	275	350	400	76	450	525	524
	APR-SEP	355	430	480	77	530	605	625
CLARKS FORK RIVER near Belfry	APR-JUL	330	385	425	79	465	520	540
	APR-SEP	380	440	480	80	520	580	603
RED LODGE CK blw Cooney Res (2)	APR-JUL	17.0	33	43	88	54	69	49
	APR-SEP	27	43	53	88	63	79	60
YELLOWSTONE RIVER at Billings	APR-JUL	2080	2550	2860	76	3170	3640	3740
	APR-SEP	2590	3070	3400	77	3730	4210	4410

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
MYSTIC LAKE	21.0	0.8	1.0	3.6
COONEY	27.4	21.5	21.4	15.9

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
YELLOWSTONE ab LIVINGSTON	24	95	84
SHIELDS	10	89	74
BOULDER-STILLWATER	8	84	79
CLARK'S FORK-ROCK CREEK	19	101	87
YELLOWSTONE above BIGHORN	54	95	82

LOWER YELLOWSTONE RIVER BASIN

Mountain precipitation during March was 130 percent of average. The cumulative precipitation since October 1 is now 110 percent of average. Mountain snowpack conditions range from 95 to 105 percent of average. Storage in Bighorn Lake is a little above average while Tongue River Reservoir has 50 percent of average. Streamflow forecasts for the spring and summer period generally range from about 75 to 85 percent of average except on the Powder River which is forecast to be about 90 percent of average. The Surface Water Supply Index is -0.1 for the Little Bighorn River and -0.4 for the Tongue River.

STREAMFLOW FORECASTS

FORECAST POINT	FCST PERIOD	<---DRIER--- FUTURE --WETTER---> CHANCE OF EXCEEDING * 90% (KAF)	70% (KAF)	50% (KAF)	50% %AVG	30% (KAF)	10% (KAF)	25YR (KAF)
YELLOWSTONE RIVER at Billings	APR-JUL	2080	2550	2860	76	3170	3640	3740
	APR-SEP	2590	3070	3400	77	3730	4210	4410
BIG HORN RIVER nr St. Xavier (2)	APR-JUL	610	995	1260	72	1520	1910	1740
	APR-SEP	705	1120	1400	73	1680	2100	1920
LITTLE BIGHORN RIVER nr Hardin	APR-JUL	39	95	133	88	171	225	151
	APR-SEP	44	105	147	86	189	250	170
TONGUE RIVER near Decker (2)	APR-JUL	86	157	205	85	255	325	240
	APR-SEP	100	174	225	85	275	350	265
YELLOWSTONE at Miles City (2)	APR-JUL	2550	3550	4230	75	4910	5910	5640
	APR-SEP	3030	4120	4860	75	5600	6690	6510
POWDER RIVER at Moorhead	APR-JUL	59	149	210	91	270	360	230
	APR-SEP	76	168	230	92	290	385	250
POWDER RIVER near Locate	APR-JUL	70	177	250	90	325	430	278
	APR-SEP	84	195	270	89	345	455	302
YELLOWSTONE RIVER nr Sidney (2)	APR-JUL	2900	3940	4650	74	5360	6400	6260
	APR-SEP	3370	4520	5300	74	6080	7230	7200

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1985 base period.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

RESERVOIR STORAGE (1000AF)

RESERVOIR	USABLE CAPACITY	** USABLE STORAGE ** THIS YEAR	LAST YEAR	AVE.
BIGHORN LAKE	1356.0	708.7	705.4	670.0
TONGUE RIVER	68.0	19.2	35.8	37.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVE.D	THIS YEAR AS % OF LAST YR.	AVERAGE
BIG HORN (Wyoming)	56	105	94
LITTLE BIGHORN	5	85	96
TONGUE RIVER (Wyoming)	15	99	106
POWDER RIVER (Wyoming)	13	101	100
YELLOWSTONE RIVER	121	98	89